Wetlands monitoring - hydrological conditions and water quality in selected transects of Biebrza National Park.

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Water Framework Directive (WFD) obligates Member States to prevent further deterioration as well as to protect and enhance the status of aquatic ecosystems and wetlands. In order to fulfill one of the WFD objectives - to keep wetlands in good surface water and groundwater status (determined by good ecological, chemical and quantitative status) it is necessary to specify most favourable conditions for them. In that case monitoring of factors responsible for wetlands status in natural areas is a key issue. Further, achieved knowledge of existing relations in ecosystems can be implemented in protection and restoration projects.

There are a number of factors influencing diversity of habitats responsible for developing different wetland ecosystems and their sustaining in good ecological status. It's believed that among significant factors such as hydrological conditions, water quality, nutrient availability in the soil, pH value and management (e.g. grazing, mowing) the hydrological conditions are the most important. In presented work authors concentrated on hydrological conditions and water quality and theirs influence on wetland vegetation of Biebrza National Park (BNP). BNP located northeast part of Poland is recognized by many scientist as a unique undisturbed wetland reference area. Five transects located in different basins of BNP were chosen. Transects consist of piezometers in which the water table levels and water quality were measured. Analysis of electroconductivity (EC), alkalinity (HCO_3^-) and pH were done directly in the field. In the laboratory anions (NO_3^-, PO_4^{3-}, Cl^-, SO_4^{2-}) and cations (NH_4^+, Ca^{2+}, Mg^{2+}, Br^+, Li^+, Na^+, K^+) concentration was determined using High Performance Liquid Chromatography (HPLC). D-divers, electronic devices to permanent measurement of groundwater level changes were located in some of the piezometers. Piezometers were located in the sites characterized by different hydrological conditions, from groundwater fed to river fed areas. Studied locations were covered mainly by *Magnocaricion* vegetation (e.g. *Caricetum gracilis* and *Caricetum elatae*), *Molinio-Arrhenatheretea* vegetation (*Molinietum caeruleae*), and *Scheuchzerio-Caricetea nigrae* vegetation (*e.g. Caricetum lasiocarpae*).

In presented work authors show results of water quality measurements and monitoring of hydrological conditions, characterized by changes of groundwater table, period and size of inundation. During six years long monitoring period (2004 – 2009 hydrological years) there were observed high diversification of groundwater and surface water levels among locations. They fluctuate in some places from very low groundwater levels, observed in late summer and in early autumn (over 1 m beneath the ground), to levels reaching surface of the ground or laying nearly below it, occurring in winter and spring. There are also places where quite high inundations in winter and spring are observed.

Collected chemical and hydrological data were statistically analyzed using STATISTICA 8 software with a use of one of the multivariate analysis – Principal Component Analysis (PCA) method. Owing to the usage of PCA analysis it was possible to define most important parameters characterizing habitats were occurs selected vegetation. The impact of hydrological conditions (presented as a main factor) on forming particular wetland plant communities can be discussed. Authors determine that some other factors (e.g. management) can be more responsible for occurrence of particular plant communities and their sustaining in good status in specific locations.